

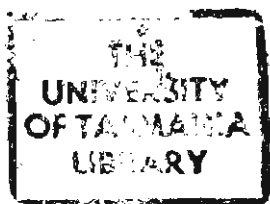
**The Ecology of the Juvenile Southern Rock Lobster,
Jasus edwardsii (Hutton 1875) (Palinuridae).**

by

Matthew Edmunds B.Sc. Hons

Submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy

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A handwritten signature in blue ink, appearing to read 'Matthew Edmunds'.

Matthew Edmunds, 26 August 1995

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Abstract

This study examined the life history of juvenile *Jasus edwardsii*, with a particular emphasis on ontogenetic shifts in ecology, and how these shifts and other ecological factors may influence recruitment rates to maturity and the fishery. The aspects examined included settlement, density and distribution, shelter utilisation and availability, diet, morphology, as well as growth, survival and movement.

Shifts in ecology, particularly in dispersion patterns, shelter utilisation and diet were found throughout the juvenile size range. However, a distinct early benthic phase was recognised, with a rapid transition from this phase occurring at approximately 35 mm carapace length (CL). More gradual shifts in ecology occurred after this size. Early benthic phase lobsters were solitary dwellers, randomly to evenly dispersed over the reef and consumed predominantly ophiuroids, isopods and bivalves. In contrast, larger juveniles were gregarious, cohabiting in shelters with conspecifics and having clumped shelter distributions. They also consumed predominantly bivalves, crabs and urchins. These changes corresponded with allometric changes in morphology.

Early benthic lobsters had specific shelter requirements compared to the broader range of shelters used by larger lobsters, and were more likely to be affected by limitations in shelter availability. Shelter availability was dependent on the substrate type and structure, but was not found to be limiting during this study. However, settlement rates during this study were low, and shelter may be limiting at higher settlement rates.

Internal microtagging techniques were developed to examine the population dynamics of newly settled lobsters (from 10 mm CL or 0.6 g). The growth of microtagged lobsters released in the wild was seasonal, ranging from a mean of 2.5 mm CL per month in summer to a mean of 1.1 mm CL per month in the winter. The loss rates of tagged lobsters from the study area, due to mortality and emigration, were high and varied between release batches, the probability of survival ranging from a maximum of 51% to less than 1%. Lobsters remaining in the study area had a high fidelity to particular shelters.

The results of this study suggest that the early benthic phase is a critical phase in determining recruitment rates to maturity and the fishery, particularly due to the influences of specific shelter requirements, increased susceptibility to predation and variations in growth and survival.

Acknowledgments

This project was first conceived while I was counting thousands of eggs for Bob Kennedy, at the Division of Sea Fisheries laboratories at Taroona. Bob filled my head with ideas about lobster ecology and microtagging, and things just escalated from there. Many thanks go to Bob for introducing me to the world of lobsters.

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